

ARMY PROGRAMS

UH-60M Black Hawk

The UH-60 BLACK HAWK is a single rotor medium-lift helicopter that provides utility and assault lift capability in support of combat and peacetime missions. The BLACK HAWK is the Army's primary helicopter for air assault, general support, and aeromedical evacuation. Additionally, the BLACK HAWK can be configured to perform command and control, electronic warfare, and special operations missions. In March 2001, the Defense Acquisition Board approved the Army's proposed Acquisition Category ID program to refurbish and modernize the BLACK HAWK fleet with a digital cockpit, upgraded engine, improved rotor blades, and a new high-speed machined cabin. The prime contractor is Sikorsky Aircraft.

The Army began fielding the UH-60A in 1978. A 1989 power train upgrade resulted in a series designation change from UH-60A to UH-60L. Since 1989, the Army has procured 539 of the newer UH-60L models, but has not modernized the previously fielded UH-60A aircraft. Procurement of 60 more UH-60L BLACK HAWKS is funded through FY05. Commencing in 2002, plans are to recapitalize 193 UH-60A aircraft until these aircraft can be inducted into the UH-60M program beginning in 2006.

The March 2001 Operational Requirements Document establishes a blocked approach to development and modernization. The near-term Block 1 aircraft is intended to extend airframe service life while providing a digital cockpit, improved performance, and improved reliability and maintainability (relative to the UH-60A) for the BLACK HAWK fleet. The far-term Block 2 aircraft has requirements that are intended to significantly increased performance and survivability. The Army plans to leverage new engine technology that should provide increased lift capability, while improving fuel efficiency. Survivability of the Block 2 aircraft is intended to be enhanced by the Suite of Integrated Radio Frequency Countermeasures and the Suite of Integrated Infrared Countermeasures, both currently in development, and by improving pilot situation awareness to aid in threat avoidance.

The UH-60M digital cockpit will be a four Multi-Function Display (MFD) "glass cockpit" that is intended to improve pilot situational awareness and enhance capabilities to communicate and operate on the digital battlefield. Cockpit functionality is planned to be finalized by System Preliminary Design Reviews (PDRs) with the design being finalized by System Critical Design Reviews (CDRs). The major cockpit component, the MFD, was re-competed by the prime contractor. Rockwell Collins was selected by the prime contractor to supply the MFD.

TEST & EVALUATION ACTIVITY

In the past year, the program has completed the air vehicle PDRs and CDRs. Draft flight test plans for Combined Test Team (government and contractor) testing are being coordinated through the Integrated Product Team process. The program office and test community are planning for accreditation of the UH-60M Cockpit Test Bed resident in Redstone Arsenal's System Integration Laboratory that will provide input to the Army Test and Evaluation Command's System Assessment that will support the Milestone C/ Low-Rate Initial Production decision.

In August 2000, Under Secretary of Defense for Acquisition, Technology and Logistics waived the requirement for full-up, system level live fire test and evaluation (LFT&E) based on an alternate plan approved by DOT&E. In October 2001, the Office of the Secretary of Defense approved the Test and Evaluation Plan for Block 1 aircraft.



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The LFT&E effort successfully executed ballistic testing of several flight critical main rotor drive and flight control components under static and dynamic load conditions. The Army updated earlier vulnerability models to be more representative of the latest design configuration. Sufficient test articles for the LFT&E program are being obtained from several damaged Army and Navy H-60 aircraft. A fully operational prototype YCH-60 that was recently retired from flight status will be used as a ground test vehicle.

TEST & EVALUATION ASSESSMENT

The primary technical risk for the UH-60M is integration of the digital cockpit. The approved UH-60M test program will provide an opportunity to evaluate the effectiveness of the digital helicopter in the tactical Internet.

During UH-60A/L Wide Chord Blade (WCB) testing in 1999, the aircraft exhibited a left lateral stick migration during turns. The migration was more pronounced in right hand turns at higher loading (greater than 1.8g) and steep angles of bank (approximately 60 degrees) maneuvers at the edge of the performance envelope. It was noted in the WCB flight test report that, unless corrected, this deficiency could result in loss of controlled flight when attempting to recover from steep right-hand rolls in a dive at low altitude. Additional WCB testing was conducted in 2002. Results from the recently completed flight test with a modified left lateral limiter showed a 15 percent increase in left lateral cyclic margin and increased roll rates when recovering from high-load factor steep turns. Maneuvers from the edge of the structural and aerodynamic envelopes were recoverable with minimal altitude loss. Test results showed that the installation of the modified left lateral limiter on an UH-60A/L equipped with WCB restored the control margins to the equivalent of those on an aircraft with standard main rotor blades. The increased control margin adequately resolves the deficiency noted in the previous WCB flight test report. The current solution (the modified left lateral limiter), as flight-tested, will ensure that application of this solution to the UH-60M platform will correct the cyclic control problems identified in previously conducted WCB testing.

Presently, the contractor is tracking the projected/planned weight empty versus the specification weight empty (12,500 lbs) against a planned growth profile (through Operational Test Readiness Review #2). This weight profile is updated weekly as more detailed information is received. The detailed information includes selection of sub-systems vendors, actual component weights, and refinement of cabin structural design. The current margin predicted for external lift capability (4,500 lb requirement) is greater than 15 percent. Specific designs for the refurbishment of the airframe tail cone and cockpit sections, along with the new cabin, are being finalized as a result of the Air Vehicle PDR and CDR.

The LFT&E plan considers the vulnerability reduction features that have been incorporated into the BLACK HAWK since its initial fielding in 1978. This plan also will use combat damage experience, subsystem qualification efforts, computer modeling and simulation, as well as sister Services' testing on similar aircraft through the H-60 (Army/Navy) Combined LFT&E Integrated Product Team. The initial component static testing and system-level dynamic testing of several main rotor drive and flight controls have been completed. The completed tests include the main transmission, several gearboxes, input and quill shafts, main rotor pitch control links, and the swashplate. Test results for the improved components tested to date are showing improved survivability. Presently, the Army is preparing detailed test plans and test assets/specimens for static and dynamic testing of the main fuel system, tail rotor subsystem, and the engine in 4QFY02 and 2QFY03.